GOLDANALYTIX Gold Screen Sensor Instruction Manual

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GOLDANALYTIX Gold Screen Sensor

Product Information

The GoldScreenSensor is a measurement device that is used to determine the conductivity of metals and alloys. It comes with an LCD color display that shows the measurement results in MS/m (Megasiemens per meter) and assigns them to the corresponding metal or alloy.

Measurement Mode

- The measured conductivity value is displayed on the upper section of the display in MS/m. The GoldScreenSensor determines the conductivity of the metal or alloy and displays it as a numerical value.

Calibration

- The GoldScreenSensor is already calibrated when delivered, so calibration before the first measurement is usually not necessary.

Results Interpretation

- The device provides information about the scratch resistance, blistering, bending, and deformation of metals and alloys.

Important Notes

- For silver alloys, please refer to point 9 for important instructions.

Product Usage Instructions

1. Ensure that the GoldScreenSensor is fully charged before use.
2. Press the power button to turn on the device.

3. Select the desired language using the language selection optionon the display.
4. Place the GoldScreenSensor on the metal or alloy surface to be measured.
5. Wait for the measurement to be completed and displayed on the screen.
6. Interpret the measurement results based on the providedinformation.
7. Repeat the measurement process for different metals or alloys if needed.
8. Turn off the GoldScreenSensor after use to conserve battery power.

About Goldanalytix And Contact

Goldanalytix, established in 2012, is the leading provider of precious metal testing methods in Germany. In our team we are working on the development of safe and reliable testing methodsfor each kind of precious metal. The GoldScreenSensor has been developed and is manufactured completely in Regensburg/Germany. Thanks to the close synergy of analytics know-how and device development, we are always up to date. Due to continuous improvements we achieve and guarantee highest standards of quality. Do you need support with product data, service assistance or customer service? Feel free to contact us through one of the following channels:

- **Homepage:** www.gold-analytix.com
- **E-Mail:** gold-analytix@marawe.eu
- **Phone:** +49 941 29020439

We are looking forward to your contact!

Introduction

Congratulations on your purchase of the Goldanalytix GoldScreenSensor. The Goldanalytix GoldScreenSensor is a handy tester which establishes the electrical conductivity of precious metal objects, especially coins and ingots, without destroying them. It does not matter if you measure your precious metal objects in blisters / capsules or not. The Goldanalytix GoldScreenSensor allows for a fast and unequivocal statement within seconds. The measuring principle of the GoldScreenSensor is based on an inductive method that allows not only for measuring the electrical conductance at the surface but also up to a depth of 650 µm. Please read these operating instructions carefully prior to the first use in order to use the GoldScreenSensor properly.

Please note: The development of improved counterfeits is the goal of each forger. In order to stay up to date on this dynamic field we recommend informing yourself on our website at **www.gold-analytix.com/GoldScreenSensor** under “Downloads”. There you can always find the most recent version of the instruction manual.

Scope of Supply

Your GoldScreenSensor set is delivered with the following elements:

- GoldScreenSensor
- Charger
- Calibration piece (Copper)
- Instruction manual
- Small suitcase
- Cardboard box

In the unlikely event that something is damaged or missing please contact Goldanalytix immediately.

Measurement Principle

The GoldScreenSensor utilises the eddy current measurement for its measurement principle. Every metal exhibits a characteristic conductance value (unit: Megasiemens per meter [MS/m]), which enables the identification of falsifications or an under-alloying. Due to similar densities, the most used metals for falsifications like tungsten, lead or tantalum usually differ significantly in their conductivity compared to precious metals or gold alloys.

The inductive testing method uses electromagnetic alternating fields, whose penetration depth depends on the applied frequency and the electrical conductance of the testing sample. The penetration depth of the GoldScreenSensor go beyond the thickness of the metal layers that normally have been applied by chemical means or by electroplating and range from approximately 250 µm (pure silver, highest conductance), 350 µm for pure gold (middle conductivity range) and up to 650 µm (gold alloys, e.g. Krugerrand, lower conductivity range). The whole sensor as well as the electronic unit is situated inside the compact casing of the battery-powered device allowing the use of the GoldScreenSensor as a mobile device.

Safety Instructions

Safety Instructions for optimal Measurement Conditions

Please be aware of the following remarks while performing measurements:

- Please use the enclosed charger only (charging time approx. 4 hours when empty, no charging symbol is

displayed while charging). Inferior products can cause incorrect measurements or damage the battery or internal electronic components of the GoldScreenSensor.

- Do not use the testing device in the presence of explosive gases, vapours or dust, or in wet environment.
- Please operate the device at room temperature and not in proximity of heat sources (e.g. fan output of your laptop). The measured values are temperature dependent and linearised by calibration with the included copper piece, but the best accuracy is achieved at room temperature.

Operation and Display Elements

Table 2 – Description of the operation and display elements

#	Description
①	LCD Colour Screen
②	Sensor Field (Ø 20 mm)
③	Control knob to operate the menu
④	Connector for charger
⑤	Indicator on charge level of battery
⑥	Display of measurement result in MS/m and assignment to the corresponding metal / alloy
⑦	Additional information (only for specific alloys)

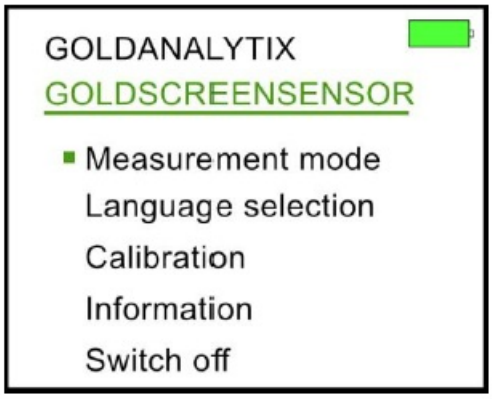
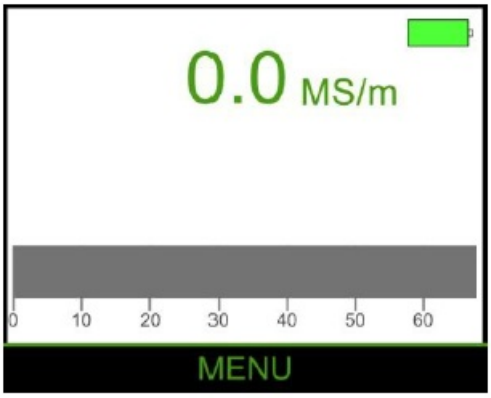
Starting the Device and Performing a Measurement

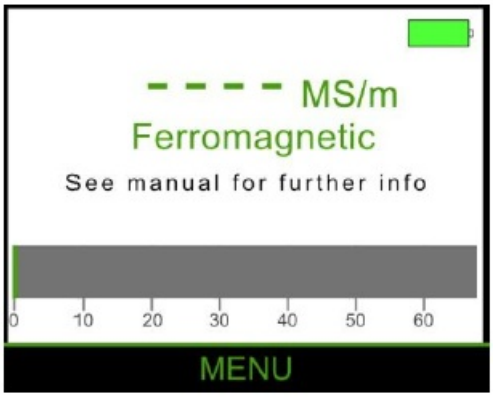
Starting the device:

In order to switch on the device, please push the control knob ③ into the direction of the case.

Main menu and measurement mode:

After the activation of the device, you will get to the main menu which offers you five options to select:

Screen	Description
	The main menu offers you five options to select: · Measuring mode · Language selection · Calibration · Information · Switch off By turning the knob, you can select the point in the menu and c onfirm your selection by pushing it. This leads you to the corres ponding submenu.
	**Measuring mode:** In order to test your object, please choose “measuring mode”. Our example will be a piece of pure gold (Au 999; nominal valu e: 44.7 MS/m). Different factors like embossing depth, fluting, s cratches, air distance, etc. can cause differences of the measur ed value to the nominal one. From a physical point of view, this i s completely normal and no obstacle for your measurements. T he ranges of tolerance can be found in the overview of conduct ances under point 10.
	Now lay the sample (e.g. like in our case a gold coin with the e mbossing Au 999) as central into the measurement circle ② as possible. This is especially important for smaller objects that do not completely cover the sensor coil (2 cm diameter; see „Evalu ation of the results“). Now, the established conductivity value is shown as a number i n the display’s upper part, using the unit Megasiemens per met er (MS/m). The GoldScreenSensor establishes which metal or alloy corresponds to this



conductivity value (the nominal value for pure gold and silver an d their alloys, as long as these are no summarized ranges [e.g. silver 900/925] is shown in round parantheses next to the estab lished alloy) and visualizes it underneath the conductivity value in the middle of the display (only pure gold and silver, their alloy s and copper). Additionally, you will have a graphical overview o f the conductivity value's position on the cale of 0- 65 MS/m tha nks to a cursor on this scale in the lower part of the screen. For the aforementioned metals and alloys, the nominal value is addi tionally tinted in green.

The device also stores further (precious) metals and alloys (esp ecially of typical fakes) –

e.g. platinum, tungsten, tungsten-copper – but these are only s hown in the section "additional information" in the zone over the scale in grey letters. With the exception of platinum and palladiu m, whose conductivities lie within the range of gold 900, the res pective ranges will not be tinted in green. If they do not lie within the range of a precious metal or a precious metal alloy, the disp lay will not show any visualization in the centre under the condu ctivity, either.

In case of a falsification (e.g. made of a tungsten alloy), the res ult could be shown as in the image on the left.

Additionnally, the GoldScreenSensor detects ferromagnetic obj ects, which is visualized by the display of "Ferromagnetic" (ima ge on the left).

Please keep in mind: Within the first five minutes of the device's operation, it may happen that the shown value does not stay stable (although a certain fluctuation of about

± 0.3 MS/m is normal). Additionally, especially in this period, th ere can be certain fluctuations of the measured values of the sa me object in several consecutive measurements. This is due to the fact that the coil first has to stabilise itself after switching the device on to guarantee a homogeneous magnetic field.

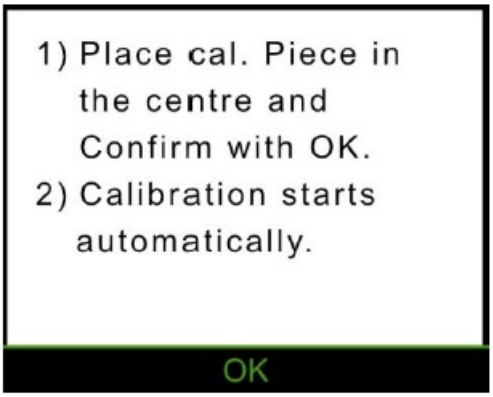
Addendum: If the shown conductivity value seems strange to you, (e.g. you know from previous measurements that your object is authentic and now, the device shows a lower conductivity value), the device set itself to zero at this moment (this happens automatically after a certain number of measurements). Please wait for a short moment (about 5 seconds) and lay your object again on the device. Now you should obtain the correct result. By pushing the knob, you will get back to the main menu.

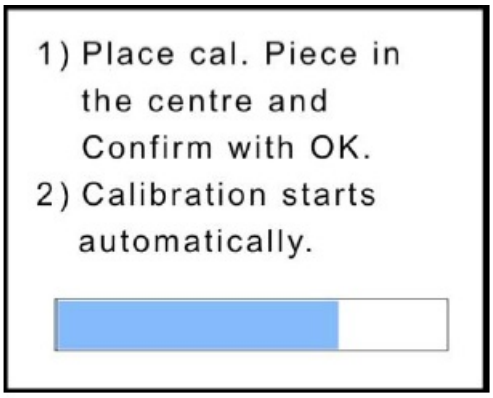
In case of uncertainties, you can also compare the measured values to the conductivity value tables in the annex of this instruction manual or other sources (interpretation of the results in the following chapter 8 “Evaluation and Interpretation of the Results”). In its measuring mode, the device always shows the measured conductivity value, as well as the material that MIGHT be present.

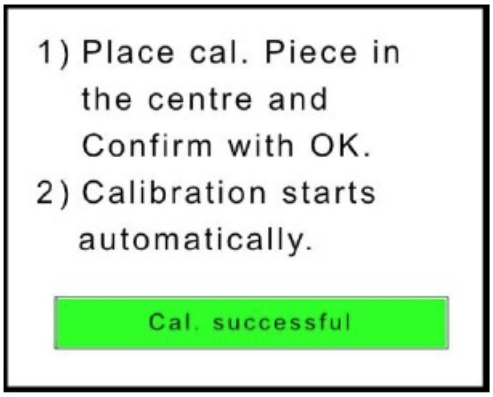
A 50 Euro-Cent coin, for instance, has a similar conductivity to those of golden Krugerrand (alloy 916(A),), platinum or palladium. This is why the GoldScreenSensor might show those as a result when testing a 50 Euro-Cent coin, even though these alloys are not present. When comparing measurements and weight, it is obvious that this is no Krugerrand.

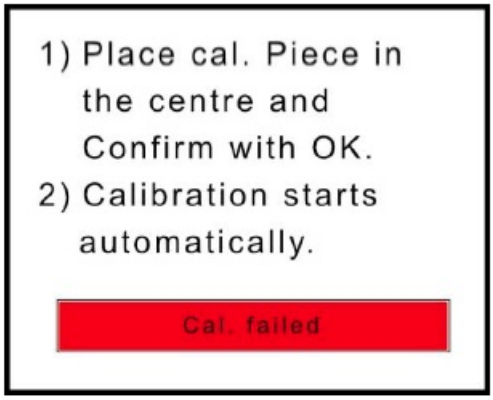
Calibration of the device

The GoldScreenSensor is calibrated before shipping, i. e. a calibration before the first measurement is usually not necessary!

Display	Description
	However, if a calibration should be necessary, you can do that b y selecting “calibration” in the main menu. Possible reasons for t his can be wrong values – despite its supposed genuineness – or surroundings with a significantly higher temperature. With the GoldScreenSensor comes a suited calibration piece made copp er. After selecting “calibration”, instructions will appear on the display as shown on the left (see picture on the left). The calibra tion process starts as soon as you put on the copper piece and confirm the process by pushing the knob. Only after this, the calibration process will start and please do n ot touch the copper piece from this moment on.







If the calibration is successful, the device will give you a feedback (picture on the left). If the calibration fails, you will also have a feedback (see picture on the bottom left). If you do not confirm the calibration by pushing the knob, the device will auto matically return to the main menu after some seconds.

Possible reasons for a failed calibration may be:

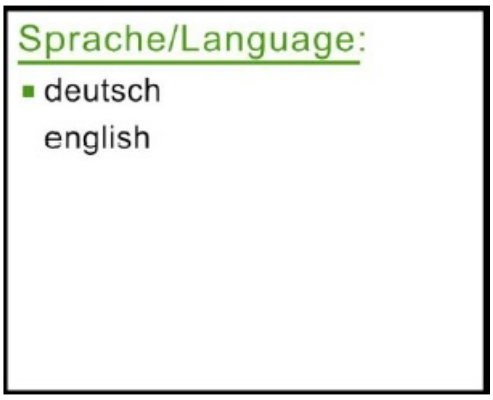
Temperature of the surroundings too high or too low

The calibration has been started before an object has been test ed in measurement mode Wrong coin/piece has been used

Please keep in mind: The factory-made calibration of the devic e is done at a strictly controlled temperature of 22 °C. As the co nductivity value as a material-specific parameter depends on th e temperature, wie recommend the use of the device exclusively at room temperature (see also “Important informatio n” in this manual). The device, as well as the sample pieces, ha s to have the same temperature as the respective surroundings!

Changing the language

The standard delivery of this device is the German version. However, if you want to change the language, please proceed like this:

Display	Description
	Please enter the „language selection“ by selecting it in the main menu and pushin the knob. Now you can select the desired lang uage. After doing so, you will be brought back tot he main menu automatically.

Evaluation and Interpretation of the Results

The following chapter gives you hints for the interpretation of the established conductivity. Please keep in mind that this device only shows the conductivity of the object and deduces from that, which material it could be. The GoldScreenSensor only measures the electric conductivity. This is why we additionally recommend in case of doubt the use of a conductivity value reference table (see annex of the manual). The following factors can however distort the results

- Scratches
- Blisters & bars / other packages
- Temperature effects (temperature of the device differs from the one of the measured object, etc)
- Striking on coins or bars
- Bends and deformations
- Uncommon coins or impurities with ferromagnetic material

PLEASE NOTE: A correct conductivity value is no guarantee that your object is not a fake. The GoldScreenSensor is a penetrating eddy current measuring device and no independent fake detector. The reason is that an alloy with the same electrical conductivity as gold can definitely be produced (e.g. copper alloys), but in this case the coins’ oder ingots’ dimensions or weight will not be correct. We therefore recommend turning to several examination methods to exclude counterfeits with certainty.

In case of coins, we recommend the following procedure:

Step 1: Establish the weight with a precision balance – does it correspond with the set value? In many cases, fakes are already detected here.

Step 2: Compare the dimensions (thickness and diameter) with the set values of the desired coins with an electronic slide gauge (can be purchased for a reasonable price in our online shop or at specialist shops) or stencils. If 1 and 2 correspond exactly to the set values (can be found on the Internet, e.g. on the websites of the producers), it can only be a fake with material of the same density – in case of gold, these are for example metals like tungsten or uranium (the latter can be ruled out for obvious reasons) or in case of silver, e.g. mixture of lead and tin or even molybdenum.

Step 3: Detection of lower alloys and counterfeits made of e.g. molybdenum, tantalum or tungsten, tungsten alloys, tungsten carbide, brass, copper and so on up to a penetration depth of about 250 µm (in case of silver) up to 650 µm (in case of Krügerrand) with our GoldScreenSensor (pure gold: ca. 350 µm).

There is no individual non-destructive method which can give you a reliable answer to whether the tested

precious metal is genuine or not. If anybody tells you something else, this person is definitely not honest or does not know it better! The reason is that any physical property (i.e. conductivity, density, sound, etc.) of any precious metal can often be imitated relatively easily with certain materials. However, materials – especially for precious metals – which are identical in two or more properties, are significantly more difficult or almost impossible to find (if, as seen above, the density corresponds, there are only a few possibilities left – and those are e.g. identified by their current conductivity). This is also true vice versa: In case of having the same conductivity, the density for example will be different. We know for instance about PAMP-gold bars made of a copper-steel alloy plated with a very thin layer of gold leading to an almost identical conductivity like pure gold. These counterfeits must be examined thoroughly with other methods (e.g. by their differing thickness or width).

Please also have a look at our website **www.gold-analytix.com** in order to get further information about the correct procedure with the non-destructive tests of precious metals. Absolute certainty, especially about the exact composition, can only be achieved with a destructive, total chemical analysis. Please don't be deterred by this information – the GoldScreenSensor detects most of the current counterfeits of bullion metals if you compare the conductivities. For example, the current frequently and very well faked ¼, ½ and 1 ounce tungsten bars and coins are easily identified. We want to point out the conscientious handling of the interpretations of the results.

Important Hints

Important Hints for Measuring with the GoldScreenSensor

Disruptive factors: We recommend dropping all your mobile devices (i.e. smartphone, mobile phone or flash drive with wireless access) at least 1 m far away from the testing device due to the inductive eddy current principle of the device. The relatively high radiation density which is especially high during connection setup can lead to false measurements. The latter can be recognized by strong deviations or oscillations of the value. After restarting the device can be used without further restrictions. Wireless LAN / Wifi or Bluetooth do not influence the measurement.

IMPORTANT: Always wait 2 to 3 seconds in between the respective measurements, in order to let the device calibrate itself. If you lay the coins onto the device to quickly, it may happen that the values are distorted. This auto-calibration process can take a bit longer sometimes. Shouldyou be unsure whether the displayed value really is the correct one, take the object off the device and wait some seconds more before putting it on again.

Please keep the temperature of the device and coins in mind – ideally, they should be about 22 °C (+/- 2°C) – the conductivity values depend on the temperature. So also make sure that you do not hold the coins and bars in your hand for too long before performing the measurement, as they would be too warm and the measurement results can therefore be false.

Penetration depth of the GoldScreenSensor: Depending on the conductivity of the material, the GoldScreenSensor penetrates into different depths into the precious metals. In case of highly conductive materials like silver (conductivity = 61 MS/m), the penetration will not be as deep as in case of metals of the middle zone (pure gold [45 MS/m] or .986 gold [about 25.5 MS/m]) and the low conductivity zone (e.g. Krugerrand alloys at 9.7 MS/m). In case of silver, you can expect about 250 µm penetration depth, whereas in case of the Krugerrand alloy the penetration depths is up to 650 µm (0.65 mm). However, this is relatively deep, if you keep in mind that most gold- or silver-plated layers are only 10 to 60 µm thick. It depends on these numbers, up to which size the precious metal objects can be measured. Generally speaking, you can measure 1 kg silver bar with this device – there will be a conductivity value. However, in case of such big objects, it is very possible that the forgers apply much thicker precious metal layers around the fake core.

Then the GoldScreenSensor will not give you a reliable answer. "Smaller" objects are normally penetrated completely by the magnetic induction field – in case of bigger ones (from 50 to 100 g, according to their geometry), forgers would have to use very little amounts of fake material in order to not get caught. It is questionable if this is lucrative for them – however, it is possible that from this size onwards, there are objects with a deeper core. This is why you should always use more than one suitable testing method, especially for objects of over 1 ounce. In case of bigger bars, you should definitely use ultrasound as well (Goldanalytix BarScreenSensor).

Testing objects should exhibit a thickness of at least 0.8 mm to 1 mm; blisters and capsules can have a thickness of up to 3 mm. Not every material shields in the same manner. If there are metallic components in the supposed plastic package, no reliable or convincing measurement can be guaranteed. Our test measurements with e.g. NGC packages have shown that they are too thick because there are several millimeter air gaps between the object and the packaging. Unfortunately, this kind of package cannot be measured. The striking and the height of the edge (especially in case of coins) can lead to a deviation, even though it is not a fake. Always put all your objects with the front- and the backside on the device.

Old coins / bars (“old” defined as before World War II) and especially objects of the 19th century may partly differ in their composition. That means that the gold content is right but the composition of the remaining amount of some coins deviates. In terms of .900 gold, those coins should consist of 900 parts gold and 100 partscopper. However, due to non-optimized production processes and analysis conditions those coins are contaminated with foreign metals which change the conductivity. Moreover, the gold used for procuding these coins has not been 100% pure so that further impurities got into the molten metal and finally into the alloy.

Alloy impurities: The range of possible impurities and their consequences can not be comprehended entirely. With our testing experience we found, that some Vrenelis 20 CHF sometimes have 10 to 20 times higher iron content than their cleanly produced “colleagues” of the same year. The gold content was correct in all of those coins (90%), however besides copper and silver some coins showed significantly higher iron contents in XRF-analysis. This means that Vreneli coins from 1922 sometimes were minted inaccurately and that not all components were controlled properly.

Through its highly accurate measuring system the GoldScreenSensor recognizes those impurities, which leads to lower conductivity values for the measured coins (iron lowers the conductance of these kinds of alloys). In conclusion to this, old coins that fall into this category are not to be considered as fake but rather as variations of the coin with frequent ferromagnetic impurities (iron or nickel). In this case we highly recommend combining more methods like a density test, gold testing acids or a XRF-test, to gain more data and find out if the coin contains the right amount of gold (or less, which happens quite often, too) or if its“just” one of the described cases. A .900 gold coin of course stays a .900 gold coin, even if instead of the other 100 parts of copper there is 98 parts of copper + 2 parts of iron. The gold content is therefore not reduced. The conductivity value can therefore change and makes the interpretation of the results more difficult.

Fine silver coins with a silver content of .9999 (Maple Leaf or Kangaroo) feature a higher conductivity value than .999 coins. This is due to the fact that even this one per mille of foreign metal within the .999 gold coins can cause a decrease in conductivity (it of course depends on the kind of impurity, in case of copper, the effect is not as strong as in case of nickel or iron). This sensitivity has a particular influence on the aforementioned deep strikings or high edges. That´s why .9999 silver coins and bars, respectively, are in the range of 62 to 64 MS/m – these values are beyond the set value of silver, but because of the measurement configuration, this is no reason to be

worried about.

Special case Krugerrand silver: Our tests have shown that the .999 silver coins result of about 55 and 59 MS/m are also an indication of a genuine material. This also applies for the “Owl of Athens” and some “Tokelau” coins.

This effect is particularly strong for silver coins with a purity of less than 958. This is why that, especially for typical commemorative silver coins, it is not possible to establish the silver content with the GoldScreenSensor. It rather shows you that the conductivity is plausible for silver (>30 MS/m) and the dimensions and the weight have to be examined very thoroughly.

Medals and jewellery can not be tested successfully by measuring the conductivity. Even if the piece is completely contiguous and covers the entire measuring field, the alloy is not known in detail. In the best case you know the gold content, however all other components of the alloy will have unforeseeable influences on the conductivity.

Particularities of the 5 DM commemorative coins of the years from 1979 (Otto Hahn) to 1986 (Frederick the Great): This series of commemorative coins has a weight of 10.0 g (previous years had 11.2 g) and consists of a copper-nickel alloy with nickel core (previous years had silver 625). These coins show a conductance of about 2.4 MS/m (nominal value of silver 625 is of about 47.0 MS/m).

The GoldScreenSensor is a perfect device for the establishment of the conductivity values of metals and genuine precious metals – but in the end, you are the one responsible for your final transactions. We therefore do not assume any responsibility for any financial losses that result from the use of the GoldScreenSensor.

An absolute secure determination can only be provided by a total chemical analysis. The GoldScreenSensor can only show you, which conductivity value the tested material has and which metal / which alloy it MIGHT be. We recommend combining several methods for maximum certainty. Please also have a look at our website **www.gold-analytix.com/knowledge**.

Jewellery and other precious metal objects with uneven surfaces – unlike coins and ingots – can not be analysed by the GoldScreenSensor. A correct result is only obtained when the measurement circle is completely covered by the object. If you want to test smaller objects, we recommend the Goldanalytix GoldScreenPen and for the jewellery, we recommend the CaratScreenPen because it allows establish the gold content of jewellery alloys.

Overview of the conductance

A1. Overview of the conductance for typical alloys in investment objects

Designation	Type	Conductance [MS/m]	Tolerance range conductivity	Fineness [‰]	Density [g/cm^3]
Gold 999	A	**45.0**	43.5-48.4	999.9	19.3
Gold 995	B	**35.2**	34-36.5	995	19.2
Gold 986	C	**25.5**	25-29	986	19.0
Gold 916 (A)	D	**9.7**	9.5-10	916	17.5
Gold 916 (B)	E	**11.1**	10.8-11.4	916	17.8
Gold 916 (C)	F	**11.8**	11.5-12.1	916	17.8
Gold 900	G	**8.9**	8.5-9.4	900	17.2
Silver 999	H	**61.0**	59-64	999.9	10.50
Silver 958	I	**52.5**	52-55.5	958.4	10.41
Silver 925	J	**51.0**	49.5-52	925	10.37
Silver 900	K	**50.2**	49.5-52	900	10.3
Silver 835	L	**48.5**	48.5-49.5	835	10.17
Silver 625	M	**47.0**	46.4-48.5	625	9.8

The information of chapter 9 has to be repected especially for silver alloys.

Type A	Investment gold bars (Degussa, Umicore, Heraeus, Agosi etc.), Vienna Philharmonic, American Buffalo, Kangaroo Nugget, Maple Leaf, China Panda, Mexico Libertad, Australian Lunar, coins Germany (100 marks collector coins etc.), UK Gold Britannia (since 2013), Spain 5000 to 80000 Pesetas
Type B	Mainly in Turkey (Nzp, Nadir, Altin) and India (RSBL) known alloy; Special case: Austria 1000 shilling 1997/98
Type C	**Please note:** The target value is a compromise between the actual target value of the 986 alloy for objects thicker than 1 mm (25.5 MS/m) and the 1&4 ducat coins Austria and their restrikes (27-29 MS/m), which are almost exclusively used in practice and are very frequent – these are special because they are very thin (0.71- 0.75 mm) and therefore below our regular minimum requirement of 1 mm.
Type D	South Africa Krugerrand, UK Gold Britannia (1987-89), Canada 100 dollars, Turkey 100 piasters, Australia 200 dollars Gold Koala, UK Sovereigns, Chile 5 pesos (1895-1980), 20 pesos (1896-1917), Peru Libra (1898-1969), Peru 50000 & 100000 Soles (*916 Au + 84 Cu*)
Type E	American Gold Eagle from the US Mint since 1986, nominal value in US dollars (*916 Au + 54 Cu + 30 Ag*)
Type F	UK Britannia (1990-2012), *916 Au + 42 Cu + 42 Ag*
Type G	Germany Reichsmark, Austria Crowns Emperor Franz Joseph until 1915 & restrikes, Greece Drachma, Austria Babenberger, Austria Florin, Swiss Vreneli (10-100 FR, 1897-1949), Netherlands Wilhemina, France Marianne/Napoleon/Republic, Italy Umberto I, Vittorio Emanuele II, Denmark Frederik VIII, Belgium Albert/Leopold II, Russia Ruble Alexander III/Nikolaus II, Russia Tscherwonetz, Gold Liberty Head US / Double Eagle, Chile Pesos (exceptions see type C), Mexico Centenario, Peru 5 to 10 Soles (1956-1979), Spain 10 to 100 Pesetas
Type H	Modern bullion coins: Canada Maple Leaf, Austria Philharmonic, American Silver Eagle, Australian Koala / Kookaburra, UK Britannia Silver (from 2013), Armenia Noah's Ark, China Panda, Lunar, Mexico Libertad (from 1996)
Type I+ J	UK Britannia Silber (1997-2003)
Type K	Austria Maria Theresia Taler, lots of medals, 10 € commemorative coins 2002-2010 and 20 € 2016-today, values are only valid for 900 and 925 silver or copper alloys & coins after 1945, older coins sometimes consist of silver-nickel alloys – these are 35-38 MS/m!
Type L	Latin Monetary Union, francs, lire, etc.
Type M	DM & € commemorative coins BRD e.g. 5 DM 1953-1979, 10 DM 1987-1997 & 10 € 2011-2015

A2. Overview of Conductance of more Precious Metal Alloys and Metals

Precious metals	**Electrical conductivity [MS/m]**	**Density [g/cm³]**
Platinum 999	9.1	21.45
Palladium 999	9.3	11.99
Osmium	10.9	22.59
Ruthenium	about 14.1	12.37
Rhodium (sintered)	18.5	12.38
Iridium	about 19.7	22.56
Foreign metals and alloys	Electrical conductivity [MS/m]	Density [g/cm³]
Copper (pure)	58.0	8.96
Copper alloys	41-57	Depends on the alloy
Aluminium (pure)	36.5	2.7
Brass	13-33	about 8.5
Magnesium	23	1.74
Molybdenum	19	10.2
Aluminium alloys	15.9-30.5	Depends on alloy
Tungsten (pure)	about 18.8	19.3
Tungsten alloys	20-28	Depends on alloy
Zinc	17	7.14
Tin	7.9	7.3
Chromium	7.8	7.19
Tantalum	7.6	16.6

Lead	4.8	11.34
Nickel silver	3.2-5.7	about 8.1 – 8.7
Antimony	2.4	6.68
Tungsten (sintered)	<2	about 19.3
Titanium	0.5-2.5	4.45
Bismuth	0.9	9.8
Iron	Ferromagnetic	7.87
Nickel	Ferromagnetic	8.9
Cobalt	Ferromagnetic	8.9

Further Testing Devices by Goldanalytix

GoldScreenPen

The GoldScreenPen is one of the most versatile electronic precious metal testers. The world´s smallest probe tip enables the user to measure of coins and bars (even through films and blisters). The measured conductivity value, which is detected up to a depth of 0.5 mm, is displayed on the digital screen. www.gold-analytix.com/goldscreenpen-electronic-gold-tester

Ultrasound Scanner – BarScreenSensor

The BarScreenSensor is one of the most important measuring instruments for testing the authenticity of gold bars (and other precious metal bars). The ultrasonic measurement allows complete penetration of all common ingot sizes of more than one ounce and detects inclusions of foreign metals at differing sound speeds. www.gold-analytix.com/ultrasound-scanner-barscreensensor

DensityScreenScale

The Goldanalytix Density Balance is a great device for testing precious metals of different sizes for their authenticity. Most fake coins, barss or jewellery can be detected by using the Density Balance because of different densities of the objects. The density of gold, for example, is higher than the density of many counterfeit alloys. www.gold-analytix.com/densityscreenscale

CaratScreenPen

The CaratScreenPen allows you to establish the fineness of gold (number of carats) of jewellery or any other goldbearing object within seconds. Thanks to the elaborate measurement design the investigation of almost any goldbearing object is possible. Additionally, the handling of the device and the visualization of the results are intuitive. www.gold-analytix.com/caratscreenpen

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Goldanalytix is a registered trademark of MARAWE GmbH & Co. KG

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Documents / Resources

	GOLDANALYTIX Gold Screen Sensor [pdf] Instruction Manual Gold Screen Sensor, Screen Sensor, Sensor

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